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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,348	07/17/2003	Alex Behfar	BIN 5/Div	8683

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EXAMINER

LEE, HSIEN MING

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 12/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/620,348	Applicant(s) BEHFAR ET AL.	
	Examiner Hsien-ming Lee	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-24 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 10-24 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

HSIEN-MING LEE
 PRIMARY EXAMINER

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>07/703</u> | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
6) <input type="checkbox"/> Other: ____ |
|--|--|

DETAILED ACTION

Remarks

1. Applicant's cancellation to claims 1-9 is acknowledged. Claims 10-24 are pending in the application.

Claim Objections

2. Claims 10-12 are objected to because of the following informalities:

In claim 10, at lines 3 and 4, replacing "first layer" with – first lithographically-defined layer – and "second layer" with – second lithographically-defined layer --, respectively, are suggested.

In claim 11, at lines 2-3, replacing "first and layers" with – first and second lithographically-defined layers – is suggested.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: optical element(s) associated with "a monolithic optical device." The claim body does not recite any optical element(s) referring back the preamble, wherein "a monolithic optical device" is recited.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 10-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Matsuura et al. (US 2001/0016247).

In re claim 10, et al., Matsuura et al., in Fig.26 and related text, teach a three-dimensional laminate structure, comprising:

- a first lithographically-defined layer 31a (i.e. a first photosensitive resist layer);
- a second lithographically-defined layer 31b (i.e. a second photosensitive resist layer) on top of said first lithographically-defined layer 31a; said second lithographically-defined layer 31b being mechanically supported by first lithographically-defined layer 31a.

In claim 11, Matsuura et al., teach a non-photosensitive layer 33a positioned at an interface between said first 31a and second 31b lithographically-defined layers, wherein the non-photosensitive layer 33a acts as a barrier film because the non-photosensitive layer 33a would hinder or suppress the mixing in the coating step and developing step of the first and second photosensitive layers adjacent to each other (paragraph [0096]).

In re claim 12, Matsuura et al., in Figs. 26 and 28 and related text, teach a three-dimensional structure, comprising:

- a substrate 30 having a top surface;
- a first layer of photosensitive material 31a on said top surface of said substrate 30, said first photosensitive layer 31a being exposed to define an arbitrary first layer pattern;

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- a second layer of photosensitive layer 31b on top surface of said first photosensitive layer 31a; said second photosensitive layer 31b being exposed to defined an arbitrary second pattern; and
- a barrier layer 33a (i.e. the non-photosensitive film) between said first 31a and second 31b photosensitive layers, said layers 31a, 33a and 31b being developed to form a three-dimensional structure having an arbitrary pattern, as shown in Fig.28.

In re claim 13, Matsuura et al., in Fig. 28 and related text, teach including multiple additional layers of photosensitive material 31c~31i, each on a top surface of a preceding layer, each additional layer being individually exposed to define corresponding patterns on corresponding layers.

In re claims 14-15, Matsuura et al., in Fig. 28, teach including barrier layers 33b~33h between adjacent photosensitive material layers 31c~31i; and the patterns of said layers 31c~31i are vertically aligned on said substrate 30.

In re claims 16 and 17, Matsuura et al. teach that said photosensitive material layers is a positive or negative photosensitive material (paragraphs [0062], [0082]).

In re claim 18, Matsuura et al. teach that the photosensitive material of at least one of said layers is a first *photoresist* material and the photoresist material of the remaining said layers is a second *photoresist* material (paragraph [0067]) because Matsuura et al. disclose that the photosensitive layers are chemically amplified *photoresist* materials.

In re claim 19, Matsuura et al. teach that each of photosensitive layers 31a~31i is a lithographically definable layer because the photosensitive layers are exposed to light via lithographical process to form the patterns (paragraph [0080]).

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 10, 12 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang et al. (US 5,275,695).

In re claims 10 and 12, et al., Chang et al., in Fig.1B and related text, teach a three-dimensional laminate structure, comprising:

- a substrate 102/104 having a top surface;
- a first lithographically-defined layer or a first photosensitive resist layer 106, said first photosensitive resist layer 106 being exposed to define an arbitrary first layer pattern (i.e. a deep recess 110);
- a second lithographically-defined layer or a second photosensitive resist layer 108 on top of said first lithographically-defined layer 31a, said second photosensitive resist layer 108 being exposed to define an arbitrary second layer pattern 112 and said second lithographically-defined layer 31b being mechanically supported by first lithographically-defined layer 31a; and
- a barrier layer between said first 106 and second 108 photosensitive resist layers, said layers 106 and 108 being developed to form a three-dimensional structure having an arbitrary pattern (i.e. 110 and 112), wherein the barrier layer refers to an adhesion

promoter layer (col. 6, lines 27-30), which acts as the barrier layer because the adhesion promoter layer would hinder a delamination between adjacent layers 106 and 108.

In re claim 21, Chang et al. teach that each of said photosensitive layers 106 and 108 is of a different shape, as shown in Fig. 1B.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 20 and 23 rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuura et al. in view of Yoshimura et al. (US 6,343,171).

In re claim 20, Matsuura et al. do not teach that the photosensitive layers are shaped to form an optical coupler.

Yoshimura et al., however, teach patterning the photosensitive material layers for wave guide, which is for optical coupling (col. 27, lines 32-33, col. 33, lines 7-9 and col. 34, 9-15).

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time of the invention was made, to shape the photosensitive layers of Matsuura et al. by patterning to form the optical coupler, as taught by Yoshimura et al, for forming an optical-electrical device.

In re claim 23, Yoshimura et al remedy the deficiency in Matsuura et al. because Yoshimura et al teach the photosensitive layer are configured as an optical grating (col. 11, line 61 through col. 12, line 14). Therefore, it would have been obvious to one of the ordinary skill in the art, at the time the invention was made to configure the photosensitive layers of Matsuura et

al. for the optical grating, as suggested by Yoshimura et al, since by this manner it would provide an optical electrical device.

11. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuura et al. in view of Richardson (US 6,381,013).

Matsuura et al. is silent as to the photosensitive resist layers being optically transparent.

Richardson, however, teaches that the photoresist layer can be optical transparent (col. 8, lines 63-64) for forming a desired device.

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time of the invention was made to utilize the optical transparent material, as taught by Richardson, for the photosensitive material layers in Matsuura et al, since by this manner it would be beneficial to the lithographical patterning step.

12. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuura et al. in view of Tran et al. (US 6,252,725).

Matsuura et al. do not teach that the substrate is an optical chip carrying monolithic optical component.

Tran et al., however, in an analogous art, teach forming an optical component layer 46 on the optical-chip substrate 42, such as GaAs (col. 3, lines 45-47); forming a photoresist layer (i.e. a photosensitive layer) on the entire optical component layer 46 (col. 3, lines 61-64); and transferring a lens pattern onto the optical component layer 46 to form a monolithic optical component 56 (abstract, line 1 and Figs. 3, 5-9).

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time of the invention was made, to implement the teachings of Tran et al. in the device of Matsuura et al

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so that the photosensitive layers of Matsuura et al are utilized as the photoresist layer of Tran, since by this manner it would be able to provide a monolithic optical component formed on the optical-chip substrate.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsien-ming Lee whose telephone number is 571-272-1863. The examiner can normally be reached on Tuesday-Thursday (8:00 ~ 6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HSIEN-MING LEE
PRIMARY EXAMINER

Hsien-ming Lee
Primary Examiner
Art Unit 2823

Dec. 8, 2004

12/8/2004